M67001.AR.004472
MCB CAMP LEJEUNE
5090.3a

Baker

Baker Environmental, Inc.
Airport Office Park, Building 3
420 Rouser Road
Coraopolis, Pennsylvania 15108

(412) 269-6000
FAX (412) 269-2002

December 20, 1993

Commander
Atlantic Division
Naval Facilities Engineering Command
1510 Gilbert Street (Building N-26)
Norfolk, Virginia 23511-2699

Attn: Ms. Katherine Landman
Code 1823

Re: Contract N62470-89-D-4814
Navy CLEAN, District III
Contract Task Order (CTO) 0160
Final RI/FS Project Plans
Operable Unit No. 10, Site 35
MCB, Camp Lejeune, North Carolina

Dear Ms. Landman:

Enclosed please find three (3) copies of the Final Remedial Investigation/Feasibility Study (RI/FS) Project Plans for Operable Unit No. 10 (OU No. 10), Site 35. Each copy of the Final RI/FS Project Plans is comprised of three, three-ringed binders that include the Work Plan, Sampling and Analysis Plan [containing both the Field Sampling and Analysis Plan (FSAP) and Quality Assurance Project Plan (QAPP)], and Health and Safety Plan (HASP).

You will note that the Final Work Plan does not contain Appendices A and B which are listed in the Table of Contents. Appendices A and B from the previously submitted Draft Final Work Plan are to be inserted into the Final Work Plan since no modifications to them were required.

Similarly, the Final SAP does not contain a Section II, Final QAPP. The Draft Final QAPP required no modifications except for Figure 4-1, Project Organization Chart and the title page. The revised Figure 4-1 and title page are attached to this correspondence. Upon replacing these two pages in the QAPP with the attached revised pages, the Draft Final QAPP will have been converted into a Final QAPP which can be inserted behind Section I, Final FSAP to complete the Final SAP.

Comments and responses to comments to the Draft Final RI/FS Project Plans for OU No. 10 are attached. An enclosed computer disk contains these responses under the file names RESPA (responses to NEHC comments on the Draft RI/FS HASP), RESPB (responses to NEHC comments on the Draft Final RI/FS Work Plan and Sampling and Analysis Plan, RESPC (responses to NCDEHNR comments on the Draft Final Project Plans), RESPD (responses to Activity comments on the Draft Final RI/FS Project Plans) and, RESPF (responses to LANTDIV comments on the Draft Final RI/FS Work Plan and Sampling and Analysis Plan.

Copies of the Final RI/FS Project Plans have been forwarded to the North Carolina DEHNR, EPA Region IV, MCB Camp Lejeune EMD, and TRC members in accordance with the distribution listed in Delivery Order No. CTO-0160 dated March 22, 1993.

If you have any questions, please do not hesitate to contact me at (412) 269-2063.

Sincerely,

BAKER ENVIRONMENTAL, INC.

Daniel L. Bonk, P.E.
Project Manager

DLB/jc
Enclosures

cc: Ms. Lee Anne Rapp, Code 183 (w/o enclosure)
Mr. Beth Hacic, Code 02231 (w/o enclosure)
Mr. Neal Paul (w/ enclosure)

SECTION II

FINAL

QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

FOR OPERABLE UNIT NO. 10
(SITE 35)

MARINE CORPS BASE,
CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0160

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
Norfolk, Virginia

Under:

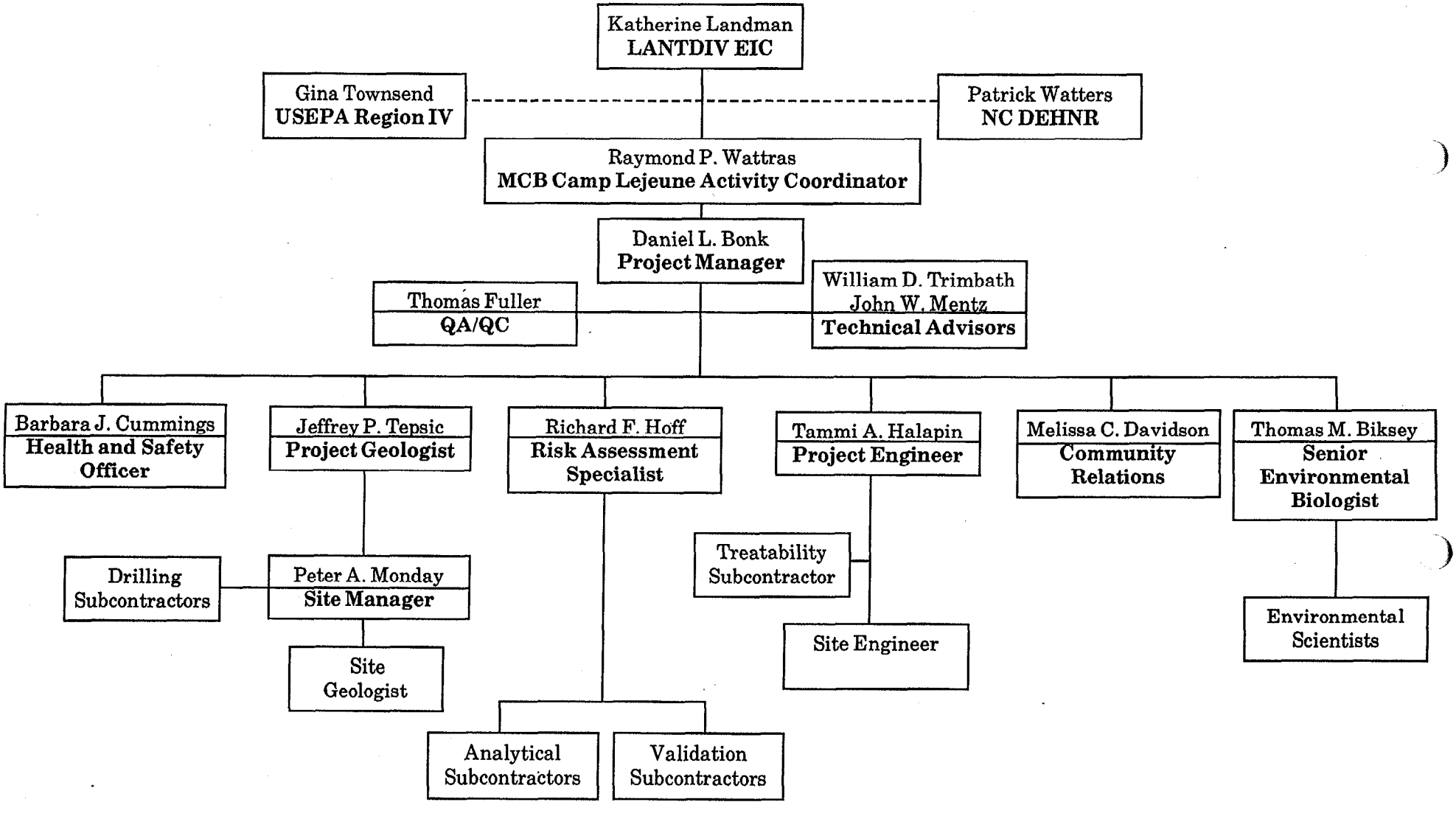
LANTDIV CLEAN Program
Contract N62470-89-D-4814

Prepared by:

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

DECEMBER 1993

FIGURE 4-1
PROJECT ORGANIZATION
RI/FS AT OPERABLE UNIT NO. 10
SITE 35
MCB CAMP LEJEUNE, NORTH CAROLINA



SECTION II

FINAL

QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

FOR OPERABLE UNIT NO. 10 (SITE 35)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0160

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
Norfolk, Virginia

Under:

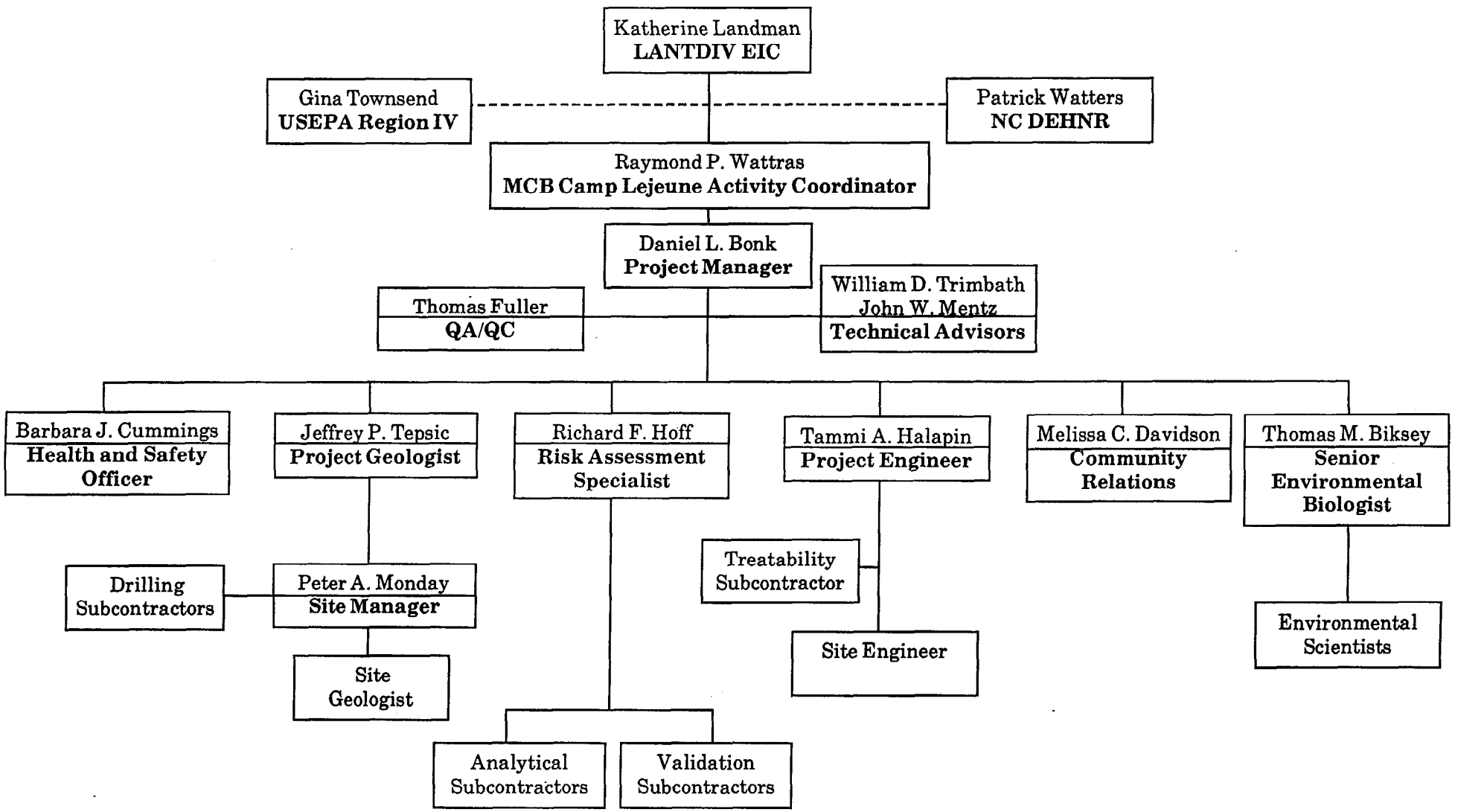
LANTDIV CLEAN Program
Contract N62470-89-D-4814

Prepared by:

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

DECEMBER 1993

FIGURE 4-1
PROJECT ORGANIZATION
RI/FS AT OPERABLE UNIT NO. 10
SITE 35
MCB CAMP LEJEUNE, NORTH CAROLINA



SECTION II

FINAL

QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

FOR OPERABLE UNIT NO. 10 (SITE 35)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0160

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
Norfolk, Virginia

Under:

LANTDIV CLEAN Program
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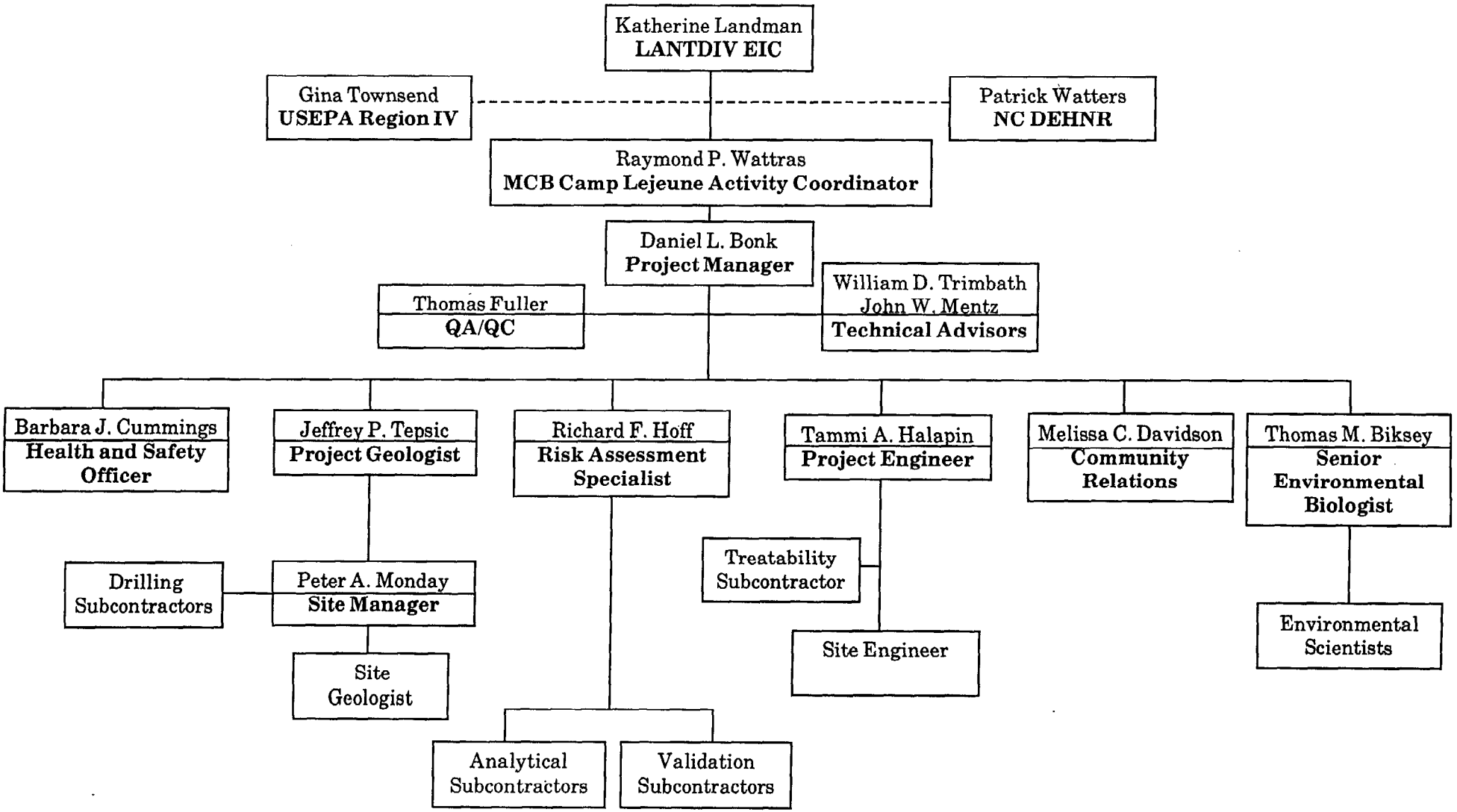
Prepared by:

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

DECEMBER 1993

FIGURE 4-1
PROJECT ORGANIZATION
RI/FS AT OPERABLE UNIT NO. 10
SITE 35
MCB CAMP LEJEUNE, NORTH CAROLINA



Attachment A
Navy Environmental Health Center Comments on the Draft Final RI/FS Health and Safety Plan for Site 35 (Operable Unit 10)

DEPARTMENT OF THE NAVY
NAVY ENVIRONMENTAL HEALTH CENTER
2510 WALMER AVENUE
NORFOLK, VIRGINIA 23513-2617

5090
Ser 611/6217
29 Nov 93

From: Commanding Officer, Navy Environmental Health Center
To: Commander, Atlantic Division, Naval Facilities Engineering Command, Code 1822, Norfolk, VA 23511-6287

Subj: MEDICAL REVIEW OF HEALTH AND SAFETY PLAN FOR MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

Ref: (a) Baker Environmental transmittal of 28 Oct 93

Encl: (1) Medical Review of the Draft Final Remedial Health and Safety Plans for Marine Corps Base, Camp Lejeune, North Carolina

1. As requested per reference (a), we completed a medical review of the "Draft Final Remedial Investigation/Feasibility Study Health and Safety Plan for Operable Unit No. 10 (Site 35) and Draft Final Remedial Investigation/Feasibility Study Health and Safety Plan for Operable Unit No. 7 (Sites 1, 28, and 30) Marine Corps Base, Camp Lejeune, North Carolina." Our comments are provided as enclosure (1).

2. The technical point of contact for comments on the review is noted in the enclosure. We are available to discuss the enclosed information by telephone with you and, if necessary, with you and your contractor. If you have any questions, please call Ms. Sheila A. Berglund, P.E., Head, Installation Restoration Program Support Department at 444-7575, extension 430.

DRAFT

W. P. Thomas
By direction

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▶ 4

To Kate Landman	From Heidi Haupin
Dept./Agency	Phone # 804 444 1575 x471
Fax #	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

HEALTH AND SAFETY PLAN REVIEW

DRAFT

Ref: (a) 29 CFR 1910.120
(b) Navy/Marine Corps Installation Restoration Manual (February 1992)

General Comments:

1. The "Draft Final Remedial Investigation/Feasibility Study Health and Safety Plan for Operable Unit No. 10 (Site 35) and Draft Final Remedial Investigation/Feasibility Study Health and Safety Plan for Operable Unit No. 7 (Sites 1, 28, and 30) Marine Corps Base, Camp Lejeune, North Carolina" was prepared for LANTNAVFACENGCOM by Baker Environmental, Inc. and forwarded to the Navy Environmental Health Center on 28 October 1993. The documents were dated 27 and 28 October 1993.

2. The plans were virtually identical. This review combines comments for health and safety and emergency response sections of both plans.

3. The method used for the review is to compare the health and safety plan to federal requirements under OSHA regulations (29 CFR 1910.120) and to Department of the Navy requirements under the "Navy/Marine Corps Installation Restoration Manual" (see references (a) and (b) above). We noted deviations and/or differences in the plan from these two primary references.

4. The point of contact for review of the health and safety plan is Ms. Mary Ann Simmons, Industrial Hygienist, who may be contacted at (804) 444-7575, or DSN 564-7575, extension 477.

Specific Comments:

1. Section 1.2, *"References"*: The last reference cited, U.S. EPA, Office of Emergency and Remedial Response, Emergency Response Division, Standard Operating Safety Guides, July 1988, has been revised. The latest edition is June 1992.

2. Section 2.0, *"Project Personnel and Responsibilities"*: The Site Manager and the Site Health and Safety Officer will be named prior to on-site activities. Since these individuals have so many responsibilities we recommend designating individuals to these positions as soon as possible. The specific names should be included in the final version of the health and safety plan.

3. Section 3.0, *"Site Characterization"*: The hazard evaluation should be the backbone of the health and safety plan. However, the information presented in this section is incomplete, confusingly presented and general in nature. Some examples are cited below. We recommend revising this section to include a clear description, associated hazards and

Enclosure (1)

DRAFT

preventive measures for each task. Avoid including general information for which site-specific information could be used. For example, Section 3.3.3.3 refers to monitoring for heat stress and/or cold stress. Since we assume the dates of the sampling are known, a site-specific determination on the type of thermal stress expected (if any) should be fairly obvious. The final product should provide a clearer understanding of site/task specific conditions.

a. Section 3.3.3.6, "Noise": Noise is anticipated as a hazard produced during drilling and other heavy equipment operation, yet, a hearing conservation program is not included nor is a method with which to evaluate noise levels.

b. Section 3.3.3.7, "Confined Space Entry": It is not clear why this section was included since there is no indication that confined space entry is anticipated during this site work.

4. Section 3.3.4, *"Radiation Hazards"*: Since there is no reason to suspect a radiation hazard, include the rationale that would lead to radiation monitoring.

5. Section 3.3.5, *"Environmental Hazards"*: The last sentence of this section cites the requirement to question each individual "as to any known sensitivities to the previously mentioned organisms or agents." This information should typically be queried during the medical surveillance examination for example while completing the medical history.

6. Section 4.0, *"Site Control"*: Information in this section is not site-specific. Include only work zone details pertaining to the actual site work.

7. Section 5.0, *"Environmental Monitoring"*:

a. Provide an explanation on how real time, direct reading instruments will be used to evaluate employee exposure levels since the exposure standards are based on an 8-hour time weighted average.

b. We recommend leaving the work area and contacting the Project Health and Safety Officer if any type of radiation exceeds background levels.

8. Section 6.0, *"Personal Protective Equipment"*: Information in this section is not site-specific. Level D or Level D+ equipment is all that is anticipated to be used, yet information on Level B and C is also included. We recommend deleting section 6.3 of this section since that information does not appear applicable to these jobs.

9. Section 7.0, *"Decontamination Procedures"*: We recommend revising this section to include only site-specific information.

DRAFT

10. Section 8.0, *"Emergency Procedures"*:

a. All phone numbers and emergency points of contact need to be verified prior to the start of work. Our attempts to contact several of the listed emergency points of contact were unsuccessful. Include phone numbers for the Agency for Toxic Substances and Disease Registry, a recognized authority on emergency responses, and for Navy emergency response personnel, such as the Navy On-Scene Commander.

b. We recommend a minimum of two employees trained in first aid/CPR on the site at all times. A Bloodborne Pathogen program, in accordance with 29 CFR 1910.1030, needs to be included for all employees who may perform first aid.

c. Include only information pertinent to the site. The emergency decontamination procedures include procedures for Level C and Level B when only Level D and Level D+ are anticipated.

d. We recommend careful review and revision (as necessary) of the sections on snake bite injury and spider bite injury. The occupational medicine physician should be able to provide technical assistance on these subjects. The last paragraph in the discussion on snake bite injury does not relate to snake bites and should be moved to a more appropriate location within the emergency procedures section.

e. Discuss the rationale for using Navy Medical Treatment facilities for civilian contractor employees.

11. Section 10.0, *"Medical Surveillance Procedures"*: There is no indication in this section that the physician has received site-specific information upon which to base the medical examinations.

12. Appendix C, *"Emergency Procedures for Exposure to Hazardous Materials/Waste"*: We recommend combining this information with the emergency procedures in Section 8.0.

Attachment B
Responses to Navy Environmental Health Center Comments on the Draft RI/FS Health and Safety Plan for Site 35 (Operable Unit 10)

Responses to Comments from the Navy Environmental Health Center (NEHC) for the Draft Final RI/FS Health and Safety Plan (HASP)
Operable Unit No. 10 (Site 35),
MCB Camp Lejeune, North Carolina

Comments Letter Received by Baker via Fax dated November 29, 1993

RESPONSES TO COMMENTS

1. Section 1.2, References: The last reference cited has been changed to reference the latest, June 1992, revision of the U.S. EPA, Standard Operating Safety Guides.

2. Section 2.0, The Site Manager and Site Health and Safety Officer (SHSO) cannot be determined at this time, however, the personnel designated will be individuals with prior experience conducting these responsibilities.

3. Section 3.0, The organization of this section presents the site background, site work plans, and the hazard evaluation for each task as opposed to each site. This format has been successfully used with several other Health and Safety Plans developed for MCB Camp Lejeune. This section is in compliance with 29 CFR 1910.120(b)(4)(ii) and the Navy/Marine Corps IR Manual (neither regulation/guidance manual is specific with how information is to be presented in the plan, and, consequently, has not been modified).

   Based on the time of year this project is to take place and various potential levels of protection it is actually possible that either cold stress or heat stress to be a potential concern.

   a. Section 3.3.3.6, Past experience evaluating noise levels of similar projects with limited drill rig and backhoe activity does not warrant a requirement for noise monitoring.

   b. Section 3.3.3.7 of the HASP indicates that confined space entry is not anticipated for this project. This section has been included to maintain compliance with 29 CFR 1910.120(b)(4)(ii)(I), which includes confined space entry as one of the minimum items the site HASP must address.

4. Section 3.3.4, Radiation monitoring equipment will be made available as a screening instrument solely for precautionary measures.

5. The last sentence in Section 3.3.5 has been removed for the Final HASP.

6. Section 4.0, Additional site specific information has been included with this section, such as, a detailed safe work practice with drill rigs. Some of the information in this section is general because exact site control measures can be dynamic in nature and are flexible based on changing site conditions. The Site Manager and SHSO use their professional judgment to incorporate the ideas presented in this section based on such things as various work locations at a site, air monitoring results, protection levels, and work task. The Project Manager and Project Health and Safety Officer (PHSO) are available and contacted as needed. This has worked successfully with other similar projects conducted for the Navy.

7. Section 5.0, Environmental Monitoring.

   a. The OSHA TWA exposure standards are used as a reference to help evaluate the health hazards of the chemicals of concern that could potentially be at a site. The non-specific real-time air monitoring that will be conducted as part of this project is more conservative than the OSHA TWAs.

   b. Previous comments received from NEHC indicated that from a health physics perspective, a more protective measure for site workers is to determine the background radiation exposure level and establish the stop work criteria as two times the background radiation exposure level. The Final HASP identifies the two times background as the stop work criteria.

8. Section 6.2 presents the site specific anticipated levels of protection for each task. Section 6.3 describes the respiratory protection that would be used if air monitoring results indicated an upgrade in protection level, as presented in Section 5.0. References to Level B respiratory protection in this section has been deleted and Level C remains.

9. Section 7.0, Decontamination Procedures, References to Level B decontamination procedures have been removed for the Final HASP.

10. Section 8.0, Emergency Procedures.

   a. The new telephone area code at MCB Camp Lejeune has replaced the previous base emergency telephone numbers on the emergency telephone list. The Agency for Toxic Substances and Disease Registry will be included with the Final HASP. The On-Scene Commander responsibilities are performed by the on-duty Fire Chief as reported by base environmental personnel. This telephone number is listed.

   b. A minimum of two personnel trained in first aid/CPR will be available on the site, as stated in the HASP. A copy of the Bloodborne Pathogen Program will be available onsite and a statement regarding this program has been referenced in the HASP.

   c. References to Level B protection levels have been eliminated in the Final HASP. Personnel will be prepared to upgrade to Level C, as necessary.

   d. The snake bite and spider bite sections have been reviewed. The last paragraph in the snake bite section has been removed in the Final HASP.

   e. The Navy Medical Treatment facilities for civilian contractor personnel will be used in the event of a chemical exposure type injury requiring emergency attention. The base hospital would also be used in the event of a life threatening injury when it is the closest hospital to access. In addition, the base ambulance only transports to the base hospital.

11. Section 10.0, Medical Surveillance Procedures, The first sentence of the second paragraph indicates that the occupational medical physician is provided information to base the medical surveillance.

12. A statement has been added to Section 8.0 that references Appendix C as containing hazardous material exposure procedures.

Attachment C
Navy Environmental Health Center Comments on the Draft Final RI/FS Work Plan and Sampling and Analysis Plan for Site 35 (Operable Unit 10)

MCB, Camp LeJeune

OU 10 Comments

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 15

To Linda Berry	From Andrea Lunsford
Dept./Agency LANTDIV, Code 1623	Phone # 804-444-7575 ext. 402
Fax # 322-4805	Fax # 444-7261

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

3 SETS of comments

To: Dan Bank
From: Linda Berry

DAN, Since Kate's out all week, I wanted to make sure you got these. Any questions, please let me know.

Linda

Also, please call me regarding scopes for OU #7 + OU #10 fieldwork!

AL

MEDICAL REVIEW OF DRAFT FINAL REMEDIAL INVESTIGATION/ FEASIBILITY STUDY WORK PLAN AND SAMPLING AND ANALYSIS PLAN FOR OPERABLE UNIT NO. 10 (SITE 35) MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

References:
(a) "Supplemental Region IV Risk Assessment Guidance," U.S. EPA Region IV memo, dtd March 26, 1991
(b) *Assessing Human Health Risks from Chemically Contaminated Fish and Shellfish* (EPA 503/ 8-89-002, September 1989)
(c) *Standard Operating Procedures and Quality Assurance Manual (February 1, 1991)*, U.S. EPA Region IV, Environmental Compliance Branch)
(d) "New Interim Region IV Guidance," U.S. EPA Region IV memo dtd February 11, 1992

General Comments:

1. The draft documents entitled "Draft Final Remedial Investigation/Feasibility Study Work Plan for Operable Unit No. 10 (Site 35)..." and "Draft Final Remedial Investigation/ easibility Study Sampling and Analysis Plan for Operable Unit No. 10, Marine Corps Base, Camp Lejeune, North Carolina," dated October, 1993 were provided to the Navy Environmental Health Center (NAVENVIRHLTHCEN) for review on 28 October 1993. The reports were prepared for Atlantic Division Naval Facilities Engineering Command by Baker Environmental, Inc.

2. The information presented in the work plan (WP) and field sampling and analysis plan (SAAP) is generally in accordance with guidance provided in pertinent Environmental Protection Agency (EPA) documents such as *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final (October 1988)*. However, there is a need for more specific information to be included. Our primary concern is that neither the WP nor the SAAP includes a detailed, site-specific risk assessment methodology section. The review comments and recommendations provided below address the need to include additional and more specific health information.

3. The technical point of contact for this review of the remedial investigation WP and field SAAP is Ms. Andrea Lunsford, Head, Health Risk Assessment Department, Environmental Programs Directorate, NAVENVIRHLTHCEN, who may be contacted at 444-7575, extension 402.

Enclosure (1)

Review Comments and Recommendations:

Sampling and Analysis Plan

1. Page 1-19, section 1.2.2 (Potential Migration and Exposure Pathways), bullet 2; and pages 5-18 to 5-24, section 5.6 (Biological and Fish Sample Collection)

Comments:

a. The Section 1.2.2 list of exposure pathways includes "wildlife (deer, mammals), fish and fowl exposure to surface and subsurface soil and surface water." Characterization of hunting activities at Marine Corps Base (MCB), Camp Lejeune are neither addressed in the SAAP nor in the WP. Nor do the texts specifically state whether exposure pathways to be included in the human health risk assessment will include human exposures resulting from consumption of wildlife and fowl.

b. Bob White quail, deer, and turkey are hunted on base. Hunting activities may or may not extend into the site. Evaluation of this pathway may not significantly impact the risk assessment; however, risks should be calculated for all completed pathways. If hunting activities are impacted by the site under investigation, risks from the consumption of wild animals should be assessed for all individuals who hunt at MCB, Camp Lejeune.

c. The Agency for Toxic Substances and Disease Registry (ATSDR) strongly encourages characterization of food chain pathways:

(1) The ATSDR Public Health Assessment Manual (PHA manual), section 6.5.1 ("Location of Populations") states: "When uptake into plants and animals is possible, the health assessor should identify populations that are exposed or potentially exposed through consumption of contaminated plants and animals." The guidance manual directs assessors to determine site-specific factors that influence the amount and frequency of contaminated food intake. In some areas, wild plants, animals and fish may constitute a significant portion of the diet of local residents, as may be the case with subsistence fishermen.

(2) In recent ATSDR/Department of Defense (DOD) meetings (e.g., November 10, 1993 meeting at the Pentagon), ATSDR has repeatedly emphasized the need for DOD facilities to ensure that food pathways are adequately addressed.

Recommendations:

a. Include a discussion of the hunting activities on or around this site. If appropriate, assess risks related to the consumption of wild animals.

b. Ensure that food pathways are specifically addressed. To facilitate ATSDR in developing an appropriate public health assessment for the site, include a separate section in the SAPP and WP documents, to describe probable food chain pathways and how they will be characterized.

2. Page 1-19, section 1.2.2 (Potential Migration and Exposure Pathways), bullet 2; and pages 5-18 to 5-24, section 5.6 (Biological and Fish Sample Collection)

Comment: The text does not specifically state whether exposure pathways to be included in the human health risk assessment will include exposures resulting from consumption of fish:

a. The last paragraph of section 5.6, which addresses the collection and analysis of fish tissue, states that fish fillets (vice whole body samples) will be analyzed "if adequate individuals from each species are not collected." Since fillet portions are generally used to assess human health risks, and whole fish are generally used for ecological risk assessment purposes, the statement suggests that the sampling results will be used for health risk assessment purposes.

b. If the intent is to use these data for human health risk assessment, the list of exposure pathways should also include exposure from consumption of biota.

Recommendation: Expand the section 1.2.2 "exposure pathway list" to include human health risks from consumption of biota.

3. Page 1-19, section 1.2.2 (Potential Migration and Exposure Pathway)

Comments:

a. Preliminary (generic) exposure pathways are listed in bullet form. The exposure scenarios listed do not distinguish between current and potential future exposures. Since exposure pathways for these two scenarios (i.e., current and future) are not separated, we cannot conclusively agree with the pathways listed. For example, a residential scenario is listed for soil pathways. This scenario is likely of concern only for future potential residents since the site being addressed is not currently used as a residential area.

b. Current and future scenario pathway models should be presented separately, based on information currently known about the sites. Separation of current and potential future scenarios facilitates review by regulators and is also advantageous in setting up the format for reporting risk estimates.

c. Reference (a) states that "a future residential scenario should be assumed unless there is strong reason to do otherwise (e.g., highly industrial areas, wetlands)." If a future residential scenario is not probable, justification for its omission should be provided.

d. Neither the SAAP nor the WP present information regarding future land use. Also, the exposed populations, which have been identified as "worker, resident and recreational users," are not defined:

(1) Site-specific information to characterize potentially exposed populations with regard to size and characteristics is not provided.

(2) Sensitive populations (e.g., infants and children, elderly people, hospitals, etc.) and their locations in reference to the specific sites are not addressed (e.g., nursing homes and child care facilities).

Recommendations:

a. Separately list the exposure pathways applicable to current and future exposure scenarios.

b. Include a future residential exposure pathway unless sufficient justification is available for its omission. If a future residential scenario is not probable, provide the justification for its omission.

c. Address future land uses for each of the sites.

d. Provide site-specific information to characterize exposed populations with respect to: location relative to the site, activity patterns, and the presence of sensitive populations.

e. Identify any distant exposed populations, such as public water supply consumers or consumers of fish, shellfish or agricultural products impacted by the site.

4. Page 1-19, section 1.2.2 (Potential Migration and Exposure Pathway); and page 2-2, Table 2-1 (Conceptual Site Model and RI/FS Objectives for Operable Unit No. 10...)

Comments:

a. Section 1.2.2 lists preliminary (generic) exposure pathways in bullet form; Table 2-1 lists "potential exposure migration pathways." Neither section 1.2.2 nor Table 2-1, adequately present potential air pathway exposures. However, the first "exposure pathway" bullet of section 1.2.2 states: "Military personnel and civilian contractors transversing through the area could be exposed to surface soil and standing water." An air pathway could be implied by this statement, especially if the soil and standing water contain volatile organic compounds (VOCs).

b. Table 2-1 indicates that exposure to VOCs "may occur due to volatization from surface water;" however, an air pathway does not seem to be further considered. Since many of the spills that are being addressed are related to fuels, the air pathway may substantially contribute to human health risks. Contaminants of potential concern include semivolatiles and inorganics, as well as volatiles. Reference (a) states that semivolatiles and inorganics "should be assumed to be airborne via suspended dust particles." If the climate and/or geologic conditions at Marine Corps Base (MCB), Camp LeJeune preclude consideration of a fugitive dust pathway, data or information should be presented to justify its exclusion.

c. During remediation efforts, air concentrations may be a substantial concern. The SAAP and the WP should address the dust air pathway, as well as exposure to airborne volatiles. Air pathway omission should be substantiated in the text (e.g., the contribution from suspended particulates is dependent on the degree of site vegetation, average humidity levels, etc.).

Recommendations:

a. Evaluate all potential air pathways in the baseline risk assessment (e.g., volatiles and dust) or provide sufficient justification for their elimination.

b. Include semivolatiles and inorganics in the evaluation of fugitive dust pathways of exposure.

5. Page 1-20, section 1.2.3 (Preliminary Public Health and Environmental Health Impacts); and page 1-22, section 1.2.4.2 (Risk Assessment)

Comment: The text states that "a preliminary risk evaluation of Site 35 has concluded that there may be potential

human and ecological risks at this site." No information is provided concerning the risk evaluation. Section 1.2.4.2 states that "no previous investigation performed to date has included the performance of a quantitative baseline human health risk assessment." From this limited information, we cannot determine if the "risk evaluation" was based on preliminary remediation goals (PRGs) or whether some other methodology was used. The risk evaluation should be described.

Recommendation: Provide details of the preliminary risk evaluation. Specifically state the methodology used to evaluate risks and provide specific results of the evaluation.

6. Page 1-22, section 1.2.4.2 (Risk Assessment)

Comments:

a. Section 1.2.4.2 states that fish and benthic samples are needed from "various locations" along Brinson Creek for use in the ecological risk assessment (ERA). Selection procedures for the "various locations" are not provided.

b. The text does not state whether the "various locations" include known harvest areas. Reference (b) states: "Sampling stations should generally be located in known harvest areas." If planned sampling locations are known harvest areas, it should be specifically stated; if they are not, other locations should be considered.

Recommendations:

a. State whether or not the selected fish sampling areas are known harvest areas.

b. If they are not known harvest areas, select alternate areas.

7. Page 3-4, section 3.2.1 (Surface Soil Sampling), paragraph 1

Comments:

a. The first sentence states that a minimum of 14 surface soil samples will be collected. The next sentence defines shallow soil samples "as so being obtained from the interval between the ground surface and six inches below the ground surface. The term "surface soil" is used repeatedly in this section; the term "shallow soil" is only used in the above sentence. A consistent format should be used when reference is made to "surface soil."

b. The collection of surface soil samples at depths of 0 to 6 inches is consistent with EPA guidance as presented in

documents such as the *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A*, December 1989 (RAGS manual). However, it is inconsistent with the Agency for Toxic Substances and Disease Registry (ATSDR) *Public Health Assessment Guidance Manual*, 1992 (PHA manual), which defines surface soil samples as "soil samples taken from depths of 0 to 3 inches."

c. The guidance reflects ATSDR's position that depths greater than three inches do not accurately reflect surface soil conditions. Under the Comprehensive Environmental Response, Compensation and Liability Act, ATSDR is mandated to perform a public health assessment (PHA) of any site which is placed on the National Priorities List. In developing PHAs at DOD facilities, ATSDR uses environmental data collected during installation restoration investigations. ATSDR summaries may reflect "no samples" taken for surface soil based on the fact that samples were taken at depth intervals greater than three inches.

d. To facilitate correlation between PHAs and health risk assessments, and in order to minimize costs associated with redundant sample collection and analysis, we encourage the adoption of "0 to 3 inches" as the norm for surface soil sample collection for future site investigations. Adoption of this sampling protocol will not be in controversy with current EPA guidance, since the RAGS manual does direct that surface soil samples be collected "at the shallowest depth practical" in order to accurately reflect the potential surface soil exposure pathway.

Recommendations:

a. Change the term "shallow soil" to "surface soil." Use a consistent format when referring to surface soil.

b. Collect surface soil samples at 0 to 3 inch depths wherever this is achievable.

8. Page 5-15, section 5.3 (Groundwater Sample Collection), #9

Comment: The text states that "[Ground water] Samples will be collected for total (unfiltered) and dissolved (filtered) metal analysis." Neither this SAAP nor the WP state which samples will be used for assessing human health risks.

a. Reference (a) states that "unfiltered groundwater data should be used to determine the exposure point concentration."

b. We recommend using both types of samples in the health risk assessment. Although the regional EPA guidance requires use of unfiltered sample results in the quantitative health risk

assessment (HRA), if risk estimates for both filtered and unfiltered samples are developed, both values can be discussed in the HRA. Since some heavy metals absorb strongly to soil/sediment particles, the differences between the resultant risk estimates from filtered and unfiltered sampling results can be large. Providing comparison values can therefore be very useful in demonstrating that the risk estimates from unfiltered ground water samples is overly conservative.

Recommendations:

a. Specifically state that unfiltered ground water will be collected and used to determine the exposure point concentration, for the HRA calculations.

b. Develop risk estimates for both filtered and unfiltered ground water samples, and discuss both values in the HRA.

9. Page 5-16, section 5.4 (Surface Water Sample Collection), paragraph 2

Comments:

a. The text states that "Care will be taken when collecting samples for analysis of volatile organic compounds (VOCs) to avoid excessive agitation that could result in loss of VOCs." It then states that VOC samples "will be taken prior to the collection of samples for analysis of other parameters" and that "sample bottles will be filled in the same order at all sample locations."

b. Section 4.2.1.1 ("Purgeable Organic Compounds Sampling (VOA)") of reference (c) provides specific guidance regarding the type of vial (i.e., 40 milliliter septum vial); the type of cap (i.e., screw-on cap with teflon-silicon disk); the filling procedure (i.e., to fill the vial by pouring down the side and to completely fill the container leaving no head space); and the need to perform a bubble check when collecting surface water samples. These procedures are not stated in the SAAP.

Recommendation: Specifically state that the Region IV procedures, listed above, will be adhered to for surface water sample collection for VOC analyses.

10. Page 5-22, section 5.6 (Biological and Fish Sample Collection), subsection 5.6.2 (Fish Collection)

Comment: The first paragraph states that fish will be collected at designated stations. The text does not specifically state whether the designated stations are known harvest areas. If they are, this should be stated. If they are not, other locations should be considered.

Recommendation: State whether or not the projected fish sampling locations are known harvest areas. If not, select alternate areas.

11. Page 5-24, section 5.6.2.1 (Analysis of Fish Species)

Comments:

a. The last paragraph of this section states: "At least ten individuals from each species, if available, will be composited and analyzed for whole body burdens of chemicals. In addition, fillets of at least ten individuals, if available, from each edible species will be composited and analyzed for chemical constituents. If adequate individuals from each species are not collected for whole-body analysis and fillet analysis, only the fillets will be analyzed."

b. Reference (b) states that composite sampling has certain advantages over single samples, such as cost-effectiveness and a more efficient estimate of the mean; however, compositing samples from several fish to a single sample precludes statistical analysis. The guidance manual further states "The benefits of compositing individual samples from a single station within a given sampling period often outweigh the disadvantages just discussed."

c. We understand that the number of samples depends primarily on the fishing success rate; however, we are justifiably concerned that sufficient samples be collected from which to make any type of risk-based decision. (We have recently reviewed several fish studies in which an insufficient number of composite samples was collected to make any type of risk-based decision.)

d. Neither the WP nor the SAPP state that fish control samples (background samples) will be collected. The "Exposure Assessment" chapter of reference (b) recommends background sampling to facilitate comparison. The guidance states: "Include samples from a relatively uncontaminated reference or control area to help define local contamination problems." Background sampling is also recommended and discussed in the RAGS manual. It states that "reference stations should closely match the characteristics of known harvest areas."

e. The ATSDR published notice of a draft guidance document entitled *Environmental Data needed for Public Health Assessments* in the March 3, 1993 Code of Federal Regulations (58 FR No. 40). The ATSDR guidance recommends the following when biota studies are performed:

(1) A sample size of "at least 20 individuals per species, per episode."

(2) Analysis of edible portions only.

(3) Analysis of individual ("grab") rather than composite samples.

(4) A control population of at least 20 individuals from a comparable uncontaminated location, for background levels.

(5) A copy of the protocol used, including how each species was harvested; how representative samples were selected; what portions were sampled and analyzed; special specimen handling procedures; contaminants analyzed for; methods used and their detection limits; etc.

Recommendations:

a. State whether samples will be composited between sampling stations.

b. Ensure that a sufficient number of composite and/or single samples are collected so that a risk management decision can be reached.

c. Include sampling in a relatively uncontaminated or reference control area. If reference stations(s) are not available (i.e., if reference stations closely matching the known characteristics of the known harvest areas do not exist), it should be so stated.

d. In developing sampling plans, address ATSDR environmental data needs.

12. Page 5-24, section 5.6.2.1 (Analysis of Fish Species)

Comments:

a. The last paragraph of this section states that "fish fillet and whole-body analysis will be performed" if adequate individuals from each species are caught. Neither the WP nor the SAAP address the fish parts that will be used to assess "whole body" analysis (i.e., whether only the edible portions of the fish will be used or whether whole fish, including viscera, will be used).

b. Neither the WP nor the SAAP provide a characterization of the potentially exposed population with respect to general method(s) of food preparation and parts of fish eaten. It is likely that the majority of MCB, Camp Lejeune and/or local fish consumers consume only the fish fillet. However, this should be determined. There are populations that consume all edible portions of the fish, or prepare fish in such a way that contaminants in other portions of the fish are of concern (e.g.,

some populations remove the viscera and boil the rest of the fish). Another issue that should be determined is whether or not the skin is taken off, or left on, the fillets.

c. The ATSDR PHA manual states that public health assessments (PHAs) should be based on measurements of the contamination in the "edible portions" of the relevant aquatic species. However, the manual also states that assessors should consider the specific dietary habits of the potentially affected population and notes that "if that information is not available, the assessor should state that an acceptable evaluation of this exposure pathway cannot be made without the information." Although the term "edible" is not specifically defined, the general discussion in the manual indicates that this is eviscerated fish, as opposed to fish fillets.

d. Optimally, the concentrations of contaminants in all edible portions of the fish and in the fillets should be determined.

Recommendations:

a. Further define the fish parts that will be included in the "whole body" samples.

b. Characterize the potentially exposed populations with respect to method of food preparation and parts of fish eaten.

c. If feasible, collect and analyze both "edible portions" and "fillets" of the fish.

WORK PLAN

13. Page 5-15, section 5.5 (Task 5 - Data Evaluation)

Comment:

a. This section consists of one paragraph which provides a cursory discussion of how data will be used, once it is received from the laboratory and is validated. Neither this nor other sections of the report address tables to be incorporated in the baseline risk assessment report.

b. Exhibit 9-1 ("Suggested Outline for a Baseline Risk Assessment Report") of the RAGS manual (pages 9-4 to 9-8) should be used as a guide for the health risk assessment (HRA) report format. Exhibit 9-1 is fairly extensive and indicates the need to incorporate a considerable amount of specific information in the report.

c. Exhibit 8-2 ("Example of Table Format for Cancer Risk Estimates") and Table 8-3 ("Example of Table Format for Chronic Hazard Index Estimates") of the RAGS manual, illustrate sample tables which present information in a specific format. The use of these formats enables reviewers to easily compare the variables in risk assessment equations. (Data presentation in some of the documents that we have reviewed effectively precludes analytical review.)

d. Reference (a) states that data summary tables should contain the frequency of detection, range of detects, average concentration and background concentration.

Recommendations:

a. Address the HRA format and include a requirement to follow the format in Exhibit 9-1 of the RAGS manual. Identify information that should be included in the HRA report.

b. Address the format for presenting analytical and risk summary data and include a requirement to follow Exhibits 8-2 and 8-3 of the RAGS manual.

c. When applicable, include the frequency of detection, range of detects, average concentration and background concentrations on data summary tables.

14. Page 5-15 to 5-17, section 5.6 (Task 6 - Risk Assessment)

Comments:

a. Section 5.6 is a short, generic summary of the risk assessment task. The text basically states that risk assessments will be performed in accordance with EPA guidelines as presented in risk assessment documents such as the RAGS manual. However, specific information is lacking.

b. Work plans should contain a separate human health risk assessment section which specifically describes the type of information that will be included in the risk assessment. Some of the types of information that should be included are:

(1) Identification of all potentially exposed populations; site-specific descriptions of tasks related to exposure pathways; present and potential future land use; media that are or may be contaminated; locations of actual and potential exposure and present concentrations at appropriate exposure points.

(2) The equations, calculations, and default assumptions used to determine exposures for all exposure scenarios (e.g., off-base, on-base, children, adults, current

land use, future land use).

(3) Parameters used to estimate exposure point concentrations (e.g., arithmetic mean, geometric mean, 95th percentile).

(4) The reference doses (RFDs) and cancer slope factors (CSFs) used to determine exposures.

(5) A discussion concerning the selection of data to be used for the risk assessment (e.g., the use and nonuse of "U", "J", and "UJ" qualified data).

(6) The selection criteria to be used to determine "compounds of concern" (e.g., comparison to background and frequency of detection statistics).

(7) An "uncertainty" section that addresses significant differences between actual site conditions and required default assumptions to determine risk. (For example, to discuss the risk associated with a potential shallow ground water ingestion scenario, or the risk associated with proxy values being used for non-detection data.)

(8) A discussion concerning the use of unfiltered ground water data to determine the exposure point concentration per guidance set forth by reference (a).

Recommendation: Discuss and/or present the information addressed above.

15. Page 5-15, section 5.6 (Task 6 - Risk Assessment)

Comment: The risk assessment section of the WP should provide specific information on the presentation of results. Section 5.6.1.2 ("Data Summary") states that "tables will be developed for each medium sampled and will indicate the frequency of detection, observed range of concentration, the means and the upper 95th percent confidence limits for each chemical detected in each medium." The following data table types should also be addressed:

a. The format of the data summary tables should be specified in advance (e.g., the summary tables should list sampling numbers on the horizontal axis and provide the analytical result of all detections on the vertical axis); this section could reference an appendix which provides the specific format of the tables.

b. The method by which proxy values will be annotated on the data summary tables should be described (e.g., the use of 1/2 the SQL is generally adopted as the proxy value for non-detects).

These data should be specifically annotated. Parentheses may be used to indicate substitute values, i.e., in addition to a "U" validation qualifier. (Note: reference (a) states that non-detects should not be incorporated into the average concentration.)

c. The methodology and the specific sampling results used to "group" data (e.g., to derive average and upper-limit concentration values) should be clearly identified and/or shown on individual tables in the remedial investigation (RI) report; this section should state that this information will be provided.

d. The text should specify that all equations used to derive intermediate parameters of the risk equations will be provided; and that all default assumptions used in the individual risk equations will be provided/listed.

e. The text should state that the risk summary tables will be presented in the format recommended in the RAGS manual (e.g., see Exhibits 8-3 and 8-4 on pages 8-8 and 8-9 of the RAGS manual.

f. In addition to the above information, the risk assessment section should specifically state that risk estimates for current and future exposure scenarios will be presented separately.

Recommendation: Expand this section to include the specific information suggested in (a) through (f), above.

Attachment D
Responses to Navy Environmental Health Center Comments on the Draft Final RI/FS Work Plan and Sampling and Analysis Plan for Site 35 (Operable Unit 10)

Responses to Comments from
the Navy Environmental Health Center (NEHC)
for the Draft Final RI/FS Work Plan
and Sampling and Analysis Plan
Operable Unit No. 10 (Site 35)
MCB, Camp Lejeune, North Carolina

Comments Letter Dated November 29, 1993

RESPONSE TO COMMENTS

General

1. No response required.

2. Section 5.6 of the Work Plan (Task 6 - Risk Assessment) has been modified with the addition of the information specified in this comment.

3. No response required.

Sampling and Analysis Plan

1. Section 5.6 of the Work Plan (Task 6 - Risk Assessment) has been modified to include a statement that hunting is prohibited in the vicinity of Site 35. As a result the consumption of terrestrial animals as an exposure pathway will not be included in the quantitative Risk Assessment. Section 5.6.1.4 indicates that the consumption of fish will be considered under the Risk Assessment.

2. The modified Section 5.6 of the Work Plan (Task 6 - Risk Assessment), which was included in response to the previous comment, addresses the concerns of this comment. Human health risks from consumption of Biota are specifically addressed in Section 5.6.1.4 - Exposure Assessment.

3. The modified Section 5.6 of the Work Plan (Task 6 - Risk Assessment) addresses the concerns of this comment. The exposure pathways applicable to current and future exposure scenarios, including a future residential pathway, current and future land uses, are listed in Section 5.6.1.4 along with site-specific information to characterize exposed populations. Distant exposed populations will not be evaluated because the risk assessment will consider more conservative scenarios that have a higher potential impact.

4. Air pathways will be evaluated in the baseline risk assessment. Volatile as well as fugitive dust emissions will be evaluated. This will cover all chemicals of potential concern at the site.

   Air data will not be collected at Site 35 because of the complexity of identifying site-specific source from permitted emissions, automobile exhaust, etc. Air concentrations from volatile emissions and fugitive dusts will be modeled if it is necessary to quantify concentrations associated with the pathway. The details of the modeling will be presented in the baseline risk assessment of the Remedial Investigation Report.

5. The text has been revised because a preliminary risk assessment was not conducted per se. If contamination is present at the site the potential for human and ecological risks does exist. This is an intuitive statement and supports generally, the need for additional site information. No other methodology was used for the purposes of this Work Plan.

6. No changes to the text are required. The fish collected from the designated stations at Site 35 will be used for both the ecological and human health risk assessments. For the ecological risk assessment purposes, an examination of upstream and downstream effects are warranted for the site investigation. The sampling strategy considers the spatial distribution of potential contaminants as well as extent of contamination within the Brinson Creek aquatic system. Consideration of potential harvest areas by human receptors is not appropriate for data to be used in an ecological risk assessment. However, these streams are used by estuarine fish species that migrate seasonally up and down tributaries leading to the New River estuary. Therefore, fish that have been exposed to the environmental conditions within the tributary have the potential to be harvested both while in the tributary and when they travel out of the tributary and into the New River estuary. For human health risk assessment purposes, the tissue data collected will be used to assess the risk from these harvest areas of concern. Although no sampling locations have been selected in the New River, Site 35 is located approximately 3,000 feet upstream of the confluence of Brinson Creek and the New River.

7. The term "shallow" has been changed to "surface" in Section 3.2.1 (Surface Soil Sampling). The surface soil samples will be collected from the interval 0 to 12 inches in accordance with EPA Region IV guidance.

8. The text of Section 5.3.4.3 of the Work Plan (Groundwater Sampling and Analysis) has been modified to indicate that groundwater will be obtained for the analysis of both total (unfiltered) and dissolved (filtered) metals. The risk assessment will be based on total metals analysis results and the dissolved metals analysis results will be used for comparison.

9. The text has been revised in accordance with this comment.

10. See Response Number 6.

11. No changes to the text are required. There are a total of three stations where fish will be collected and composited for tissue analysis. Therefore, the maximum statistical sample size for the fish collection effort at Site 35 is three for each species of fish collected. However, if sampling success precludes obtaining the same species of fish from each station, the statistical sample size for the fish collected will be less than three. The benefit of composite sampling is to ensure that adequate sample volume is collected for the laboratory to conduct their analytical sampling. There are many field conditions that are not within the control of the field sampling team that potentially may impact the success rate of the fish collection effort. Although fishing success rate does affect the number of samples collected, previous studies have successfully collected an adequate number of fish from similar tributaries on MCB, Camp Lejeune to ensure that equal numbers of similar size fish have been included in each composite from the designated stations.

Stations have been sampled in the White Oak River as reference stations. Based on conversations with representatives of the North Carolina DEHNR, stations were located in Hadnot Creek. In addition, fish and shellfish currently are part of state and Federal contaminant monitoring programs and will provide additional opportunity for statistical comparison of tissue concentrations.

The fish collected and composite tissue samples analyzed will be used to conduct CERCLA ecological and human health risk assessments. CERCLA guidance was used to guide the selection of appropriate sample size and target species for conducting the risk assessments and for making risk management decisions.

12. No changes to the text are required. For whole body analysis, the entire fish will be composited and the tissue analyzed. These results will be used to address ecological risk assessment endpoint evaluations. For the fillet composites, which will be used to provide the body-burden input into the human health risk assessment equations, the following procedure will be used:

    Fish with scales will have scales removed but not the skin. Scaleless fish will have the skin removed. The fillets will include side flesh from immediately behind the base of the pectoral fin to the base of the tail. The belly flap and dark muscle tissue in the vicinity of the lateral line will not be separated from the light muscle tissue mass. Bones will be removed that remain in the tissues after filleting. The selection of the side flesh including white and dark muscle tissue for tissue analysis is appropriate for the targeted receptors because it is not believed that the fisherman that harvest fish caught will consume all the edible portions of the fish.

    For cost-effectiveness, the tissue analysis only will include fillets from fish species considered to be edible. Tissue analysis of eviscerated fish will not be conducted. The fillet data will provide the necessary tissue body-burden information for conducting the human health risk assessment as per CERCLA guidance. Because the number and size of fish collected is subject to site-specific environmental conditions, only selecting the fillet tissue analysis preparation procedure will ensure that adequate and similar tissue quantities will be generated to maintain the highest number of samples for statistical consideration.

Work Plan

13. No changes to the text are required. - Baker views the RAGS Manual as a guidance document rather than as a set of specifications. The information identified in this comment will be presented in the baseline risk assessment, however, Baker feels it would be inappropriate and excessively costly to address format and presentation questions in the Work Plan.

14. See Response Number 2 under "General."

15. See Response Number 14.

Attachment E
North Carolina DEHNR Comments on the Draft Final RI/FS Project Plans for Site 35 (Operable Unit 10)

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary

DEHNR

November 23 1993

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To DAN BOWE	From LINDA BERRY
Co. BAKER	Co.
Dept.	Phone #
Fax # 412-269-2002	Fax #

Commander, Atlantic Division
Naval Facilities Engineering Com
Code 1823-2
Attention: MCB Camp Lejeune,
Ms. Katherine Lan
Norfolk, Virginia

Commanding General
Attention: AC/S, Environmental Management
Building 67, Marine Corps Base
Camp Lejeune, NC 28542-5001

RE: Draft Final Remedial Investigation Feasibility Study Work Plan, Sampling and Analysis Plan, and Health and Safety Plan for Operable Unit #10 (site 35)

Dear Ms Landman:

The referenced documents have been received and reviewed by the North Carolina Superfund Section.

Our comments are attached. Comments on the Health and Safety Plan are attached as a memorandum from David Lilley, our Industrial Hygienist, to myself. Note also that the Health and Safety Plan comments were also provided on the draft version of the document. Please call me at (919) 733-2801 if you have any questions about this.

Sincerely,

Patrick Watters

Patrick Watters
Environmental Engineer
Superfund Section

cc: Gina Townsend, US EPA Region IV
Neal Paul, MCB Camp Lejeune
Bruce Reed, DEHNR - Wilmington Regional Office

North Carolina Superfund Comments
Camp Lejeune MCB Operable Unit 10 Draft Final RI/FS Project Plans

RI/FS Work Plan

1. Page 2-11, Section 2.2.1

This section states that Camp Geiger is located at the extreme northeast corner of MCB, Camp Lejeune. This should indicate northwest instead of northeast.

RI/FS Sampling and Analysis Plan

2. Page 1-12, Section 1.1.2.1
Same comment as number 1 regarding northwest versus northeast.

3. Page 2-2, Table 2-1
Assessing the physical properties of the soils and aquifers (noted in Table 2-2 of the Sampling and Analysis Plan) is not included as part of the RI/FS Objectives of Table 2-1.

4. Page 2-5, Section 2.3
The reference to Section 5.4 of the Work Plan in the second sentence should be 5.3

5. Page 5-1, Section 5.1.1
The last sentence of the first paragraph pertains to sand installation for deep monitoring wells and not to hand auger soil borings.

6. Page 4-2, Figure 4-1, Quality Assurance Project Plan
This figure needs to be updated to reflect the current organization for LANTDIV EIC, USEPA Region IV and NC DEHNR.

November 8, 1993

TO: Patrick Watters

FROM: David Lilley DBL

RE: Comments prepared on the Draft Final Remedial Investigation/Feasibility Study Health and Safety Plan for Operable Unit No. 10 (Site 35), MCB Camp Lejeune, NC

7. 1. Page 5-2: It is unclear to the reader what information is being conveyed by differentiating between external and internal probes for radiation survey meters.

8. 2. Appendix A, Safe Boat Operations: "Federal Requirements for Recreational Boats" is not included in this appendix as stated.

DL/dl/wpcommen.doc/22

Attachment F
Responses to North Carolina DEHNR Comments on the Draft Final RI/FS Project Plans for Site 35 (Operable Unit 10)

Responses to Comments from the North Carolina DEHNR
for the Draft Final Project Plans
Operable Unit No. 10 (Site 35),
MCB Camp Lejeune, North Carolina

Comments LetterReceived by Baker via Fax Dated November 29, 1993

RESPONSES TO COMMENTS

Work Plan

1. Northeast has been changed in the text to northwest.

Sampling and Analysis Plan

2. Northeast has been changed in the text to northwest.

3. Bullets have been added to Table 2-1 under the column titled "Site-Specific RI/FS Objectives" to be consistent with Table 2-2.

4. The reference to Section 5.4 has been changed to Section 5.3.

5. The sentence referred to in the comment has been deleted.

Quality Assurance Project Plan

6. Figure 4-1 of the Quality Assurance Project Plan has been modified as per this comment.

Health and Safety Plan

7. This radiation meter has two separate probes. The external probe is the Scintillator tube which has a setting for milliroentgen (m/R) per hour scale. This probe is used for high energy gamma sources. Whereas, the GM Pancake internal probe is a different probe used with a separate setting on the instrument. The internal probe measures beta and lower energy gamma and registers as counts per minute.

8. The remaining portion of Section 7.0 - Safe Boat Operations will be included with the Final HASP for this project.

Attachment G
Activity Comments
on the Draft Final RI/FS Project Plans
for Site 35 (Operable Unit 10)

INSTALLATION RESTORATION

UNITED STATES MARINE CORPS

ENVIRONMENTAL MANAGEMENT DEPARTMENT

MARINE CORPS BASE

CAMP LEJEUNE, NORTH CAROLINA

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To DAN BOAK	From KATE LANDMAN
Co. BAKER	Co. LANTDIV
Dept.	Phone # 804-322-4818
Fax # 412-269-2002	Fax # 804-322-4805

1) 322-4805

FROM: WALTER T. HAVEN (GEOLOGIST)

COMMENTS: ENCLOSED ARE COMMENTS FROM THE OU #10 RI/FS HASP, SAP, AND WORK PLAN. IN ADDITION, COMMENTS FROM THE OU #7 RI/FS SAP ARE ENCLOSED AS WELL. WE HAVE REVIEWED THE OU #7 RI/FS HASP AND WORK PLAN AND HAVE NO COMMENTS. - THANKS - WALT

DAN-
I GOT YOUR TUES. FAX ABOUT CTO-160. I THINK I CAN TAKE CARE OF IT FROM THIS END. I'LL CALL YOU IF I NEED MORE...

M WITH THIS TRANSMISSION, PLEASE CALL (919) 04 (DSN 484-5063). OUR FAX NUMBER IS (919) 451-1164 (DSN 484-1164).

THANKS,
- KATE

PAGE 1 OF 14 PAGES

11/18/93

DRAFT FINAL

HEALTH AND SAFETY PLAN
OPERABLE UNIT NO. 10 (SITE 35)

MARINE CORPS BASE, CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

CONTRACT TASK ORDER 0160

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
Norfolk, Virginia

Under the:

LANTDIV CLEAN Program
Contract N62470-89-D-4814

Prepared By:

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

OCTOBER 28, 1993

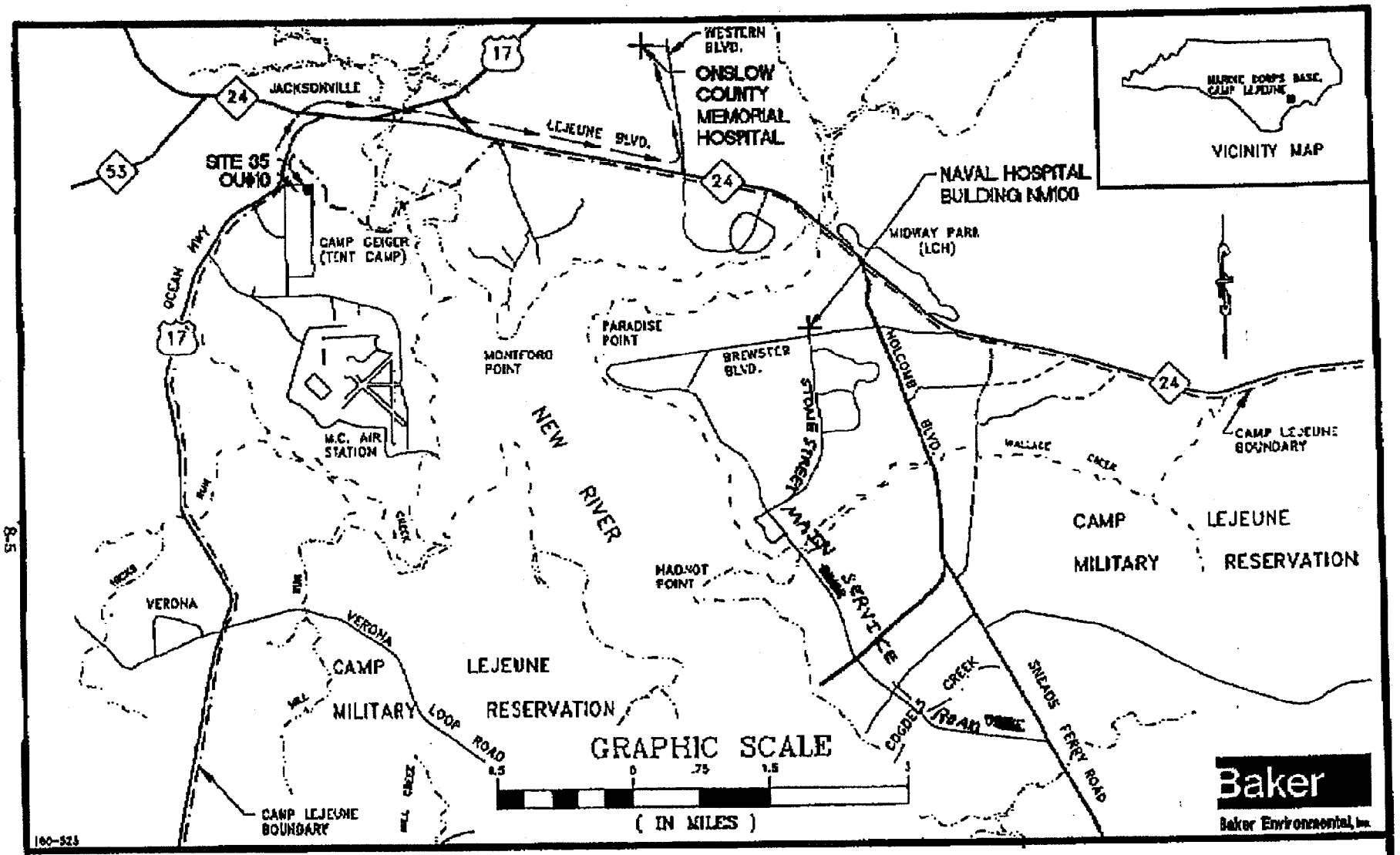

FIGURE 8-1
EMERGENCY HOSPITAL ROUTE
SITE 35

MARINE CORPS BASE, CAMP LEJEUNE

Draft Final

Remedial Investigation/Feasibility Study Work Plan

for Operable Unit No. 10 (Site 35 - Camp Geiger Area Fuel Farm)

Marine Corps Base Camp Lejeune, North Carolina

Prepared For:

Department of the Navy
Atlantic Division
Naval Facilities
Engineering Command
Norfolk, Virginia

Under the:

LANTDIV CLEAN Program
Contract N62470-89-D-4814

Comprehensive Long-Term Environmental Action Navy

The construction of nested wells is deemed appropriate at this site because the majority of the existing shallow wells (i.e., those installed by Law in 1991 and 1992) are similarly constructed. The results of groundwater sampling and analysis from several of the existing double-nested wells performed under previous investigations has indicated that contamination is present at higher levels in the deeper of the two screened intervals. It is assumed that all of the shallow wells will be constructed with flush-mounted casings and locking caps. Detailed well construction information and well installation procedures are provided in the FSAP and QAPP.

Additional wells may be required based on the results of the soil gas and groundwater field screening.

5.3.4.2 Deep Groundwater Wells

Five deep groundwater wells (GWD-1 through GWD-5) are to be installed under the RI/FS below the clay layer identified in borings SB-1, SB-2, and SB-3 (Law, 1992) at depths ranging from 35 to 43 feet bgs. This clay layer may represent the confining aquitard that separates the shallow water table aquifer from the regionally significant Castle Hayne formation. The proposed locations are shown on Figure 5-2. In effect, the screens for these deep wells would be set only a few feet deeper than the deeper of the two screens in the double-nested shallow groundwater monitoring wells and would be separated only by the assumed confining layer.

The purpose of the deep wells is to provide data to define the vertical extent of contamination in areas where analytical results of shallow groundwater samples obtained under previous investigations have identified elevated levels of organic contaminants. One of the five deep wells (GWD-1) will be installed in an area suspected to not have been impacted (i.e., at the northwest corner of the intersection of Third and "D" Streets) to provide background data. Two of the remaining four deep wells (GWD-3 and GWD-5) are located adjacent to wells MW-10 and MW-19 where elevated levels of halogenated organics were detected in the lower portions of these double-nested wells screened from 25.5 feet to 29.5 feet and from 22.5 feet to 24.5 feet, respectively. The other two deep wells (GWD-2 and GWD-4) are located near wells MW-2 at the former Mess Hall Heating Plant and MW-25 located north of the Fuel Farm (buildings TC362 and STC369). Both of these wells are located in areas where elevated levels of petroleum hydrocarbons were identified in previous studies (ATEC, 1993 and Law, 1992).

REFERS TO LAW'S WELLS

BASED ON EPA GUIDANCE AND CAMP LEJEUNE'S RECOMMENDATIONS, EACH WELL SHOULD HAVE ITS OWN BORE HOLE.

The deep wells will be constructed of 2-inch diameter, schedule 40, PVC casings. Well screens will be 5 feet in length and will be constructed of No. 10 slotted PVC. It is assumed that all of the deep wells will be constructed with stick-up (2 to 3 feet) steel casings, locking caps, and protective bollards. Detailed well construction information and well installation procedures are provided in the FSAP and QAPP.

5.3.4.3 Groundwater Sampling and Analysis

One round of groundwater samples will be collected from each well installed under this RI/FS. This will result in two samples (i.e., upper and lower zone) from each shallow double-nested well location for a total of 10 samples from newly installed shallow monitoring wells. In addition, deep groundwater samples will be obtained including one from each of the five deep wells.

→ REFER TO COMMENT ON PAGE A5-11.

Samples from four of the five newly-installed double-nested shallow groundwater wells (MW-29 through MW-32) will be analyzed for VOAs via EPA Method 601/602 including MTBE (methyl tertiary butyl ether)as these wells will be installed to provide data regarding the source and extent of the previously identified halogenated organic shallow groundwater contamination. In addition , a sample from well MW-33 will be analyzed for full-scan TCL organics and TAL inorganics

Samples from four of the five newly-installed deep groundwater monitoring wells (GWD-1 through GWD-4) will be analyzed for VOAs via EPA Method 601/602 including MTBE, TCL SVOAs, and TAL Metals. A sample from well GWD-5 will be analyzed for full-scan TCL organics and TAL inorganics. This data will be used to support the baseline risk assessment and to provide information regarding the vertical extent of groundwater contamination.

In addition to the groundwater samples obtained from the newly installed shallow and deep monitoring wells, a single round of groundwater samples will be obtained from a selected number (12) of existing shallow groundwater monitoring wells to provide comparative data and for use in the baseline risk assessment. The existing wells to be sampled include shallow double-nested wells MW-2, 9, -10, -14, -16, -19, -21, -22, and -26, and single shallow wells EMW-3, -5, and -7. The selection of these 12 wells was based on the results of previous investigations (Law, 1992 and ATEC, 1993). Six of the wells (MW-10, -14, and -19, and EMW-3, -5, and 7) were identified as the only wells exhibiting elevated levels of the halogenated organic compound TCE (trichloroethylene). The remaining six wells (MW-2, -9, -

Draft Final
Remedial Investigation /Feasibility Study for Operable Unit No. 10 (Site 35) Marine Corps Base, Camp Lejeune, North Carolina

SAMPLING AND ANALYSIS PLAN

Baker
Baker Environmental, Inc.

FOSTER WHEELER

WESTON

1. After sample collection, remove the soil from the split-spoon sampler. Prior to filling laboratory containers, the soil sample should be mixed thoroughly as possible to ensure that the sample is as representative as possible of the sample interval. Soil samples for volatile organic compounds should not be mixed. Further, sample containers for volatile organic compounds analyses should be filled completely without head space remaining in the container to minimize volatilization.

2. Record all pertinent sampling information such as soil description, sample depth, PID or OVA reading, sample number, sample location, and time of sample collection in the field logbook. In addition, label, tag, and number the sample bottle(s) as outlined in Section 6.0.

3. Pack the samples for shipping. Attach seal to the shipping package. Chain-of-Custody Forms and Sample Request Forms will be properly filled out and enclosed or attached (Section 6.0).

4. Decontaminate the split-spoon sample as described in Section 5.6. Replace disposable latex gloves between sample stations to prevent cross-contamination of samples.

5.2 Monitoring Well Installation and Well Development

5.2.1 Well Installation

THIS IS CONTARY TO EPA GUIDANC AND CAMP LEJEUNE'S RECOMMENDATIO EACH WELL NEEDS TO HAVE ITS OWN BORE H

Shallow, double-nested wells and deep monitoring wells (Type II and possible Type III deep wells) will be installed on site to monitor the shallow and deeper water-bearing zones. It is estimated that shallow, double-nested wells will be installed to depths of 20 to 35 feet bgs. As described in Section 3.0, the upper-screened interval of the shallow wells will be installed 12 to 15 feet below the water table. The upper screened interval will be 15 feet long, the lower screened interval will be based on the depth of the underlying clay layer identified previously by Law as a possible confining aquitard. The lower screened interval will be 5 feet long with its lower end set one to two feet above the underlying clay layer (estimated at 35 to 43 feet bgs).

Procedures for the installation and construction of shallow, double-nested monitoring wells are presented below:

MODIFY PROCEDURE BASED ON COMMENT ON PAGE #5-4.

- Fifteen feet of 2-inch I.D., Schedule 40, #10 slot (0.010-inch) screen with a bottom cap will be installed for the upper screened interval. The screen will be connected to a threaded, flush-joint, PVC riser. The screen will extend two to three above the seasonal high static groundwater table surface. The riser will extend to approximately six inches below the ground surface.

- The annular space above the bentonite seal will be backfilled with a cement-bentonite grout consisting of either two parts sand per one part of cement and water, or three to four percent bentonite powder (by dry weight) and seven gallons of potable water per 94 pound bag of portland cement. The cement-bentonite grout will be installed via tremie method in wells constructed with cement-bentonite grout seal layers longer than 25 feet.

- A sodium bentonite seal at least 24-inch thick, unless shallow groundwater conditions are encountered, will be placed above the sand pack. The bentonite shall be allowed to hydrate for at least 2 hours before further completion of the well.

- The depth intervals of all backfill materials shall be measured with a weighted measuring tape to the nearest 0.1 foot and recorded in the field logbook.

- The monitoring wells will be completed at the surface. The aboveground section of the PVC riser pipe will be protected by installation of a 4-inch diameter, 5-foot long steel casing (with locking cap and lock) into the cement grout. The bottom of the surface casing will be placed at a minimum of 2-1/2, but not more than 3-1/2 feet below the ground surface, as space permits. For very shallow wells, a steel casing of less than 5 feet in length may be used, as space permits. The protective steel casing shall not fully penetrate the bentonite seal.

- The top of each well will be protected with the installation of four, 3-inch diameter, 5-foot long steel pipes which will be installed around the outside of the concrete apron. The steel pipes shall be embedded to a minimum depth of 2.5 feet in 3,000 psi concrete. Each pipe shall also be filled with concrete. A concrete pad shall be placed at the same time the pipes are installed. The pad will be a minimum of 4-feet by 4-feet by 6-inches, extending two feet below the ground surface in the annular space and set two inches

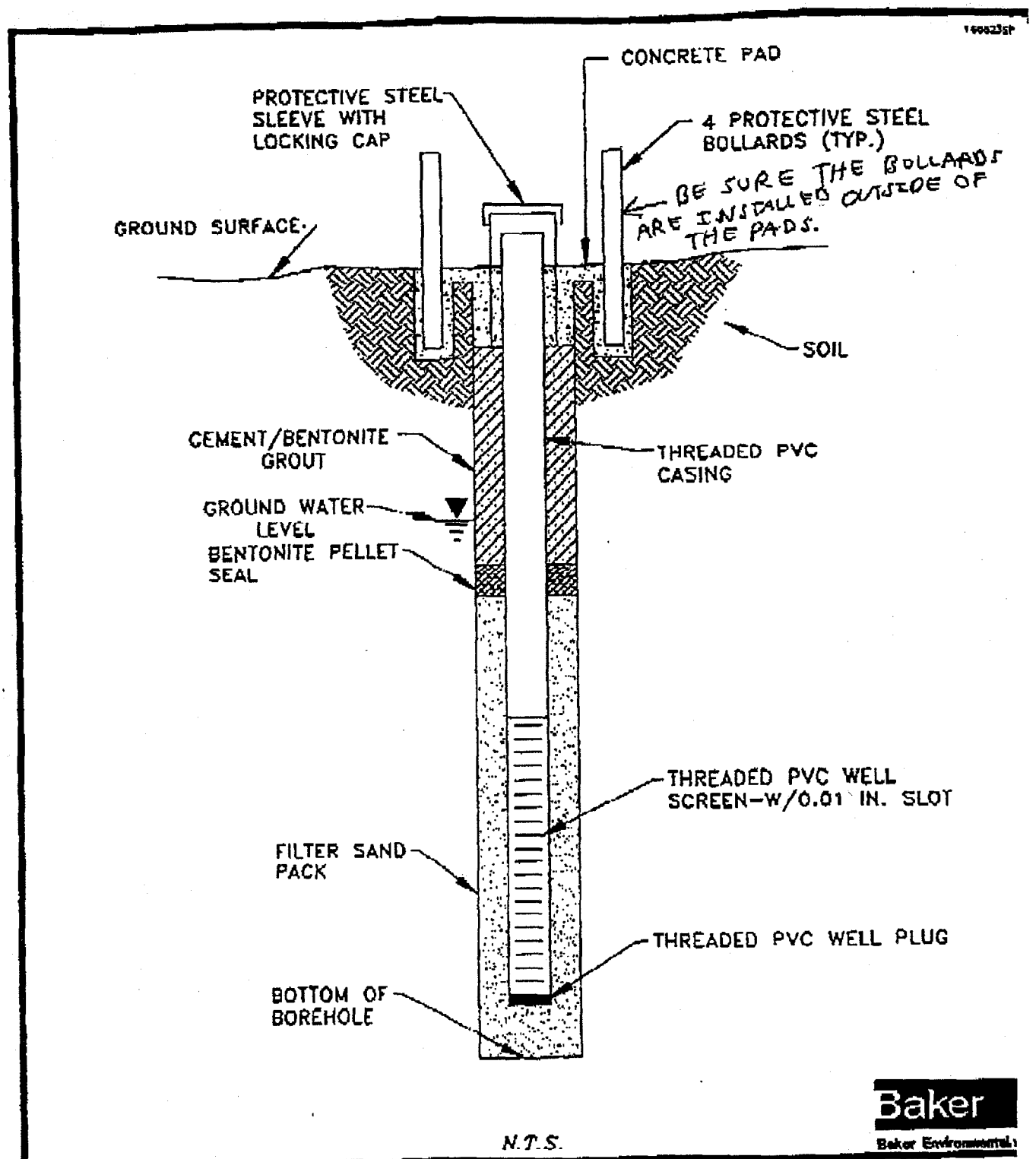

FIGURE 5-1
TYPICAL DEEP ABOVE GRADE TYPE II GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM
SITE 35

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

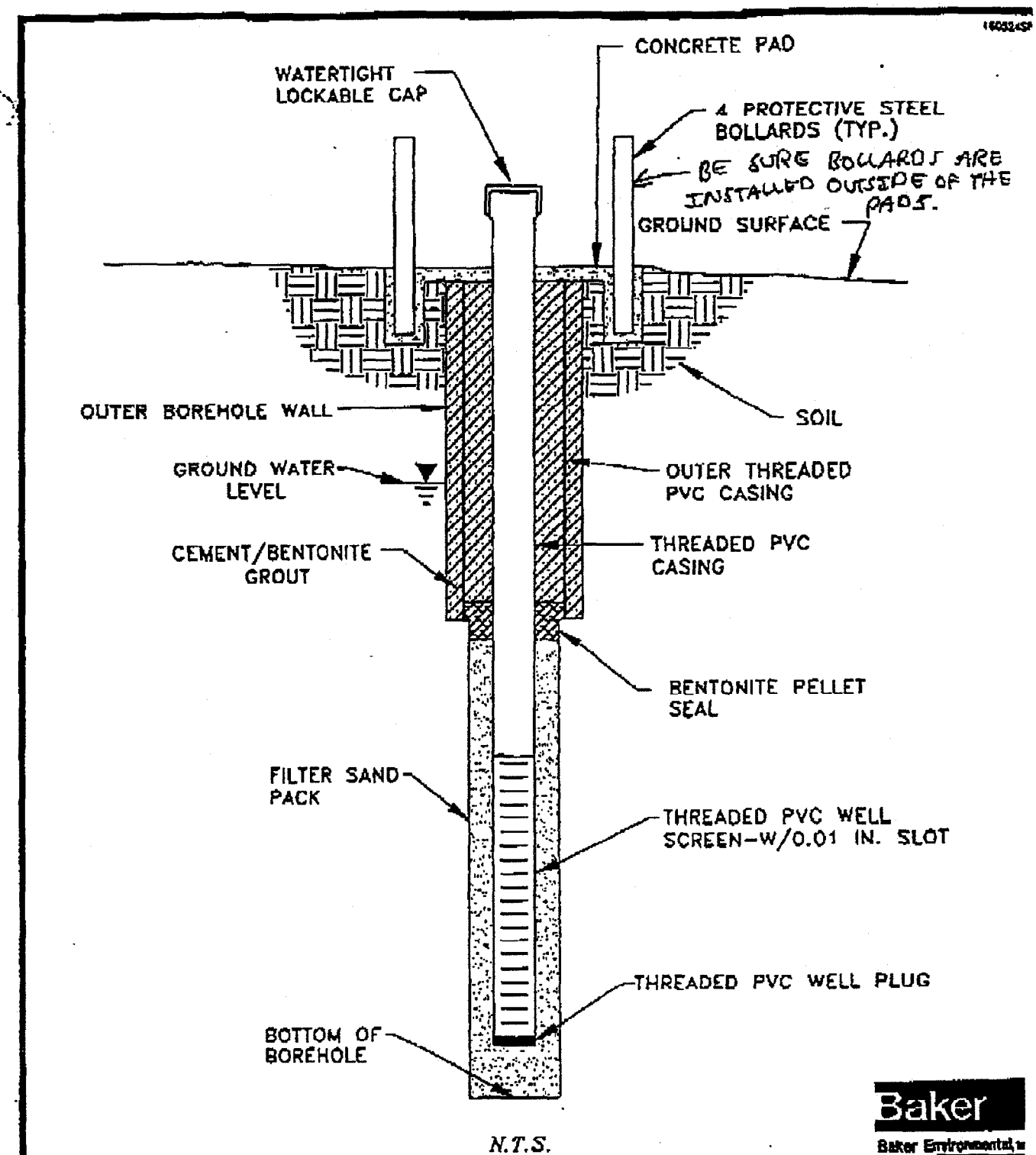

FIGURE 5-2
TYPICAL DEEP ABOVE GRADE TYPE III GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM
SITE 35

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

Attachment H
Responses to Activity Comments on the Draft Final RI/FS Project Plans for Site 35 (Operable Unit 10)

Responses to Comments from the Activity for the Draft Final RI/FS Project Plans Operable Unit No. 10 (Site 35), MCB Camp Lejeune, North Carolina

Comments Letter Dated November 18, 1993

RESPONSES TO COMMENTS

Health and Safety Plan

1. Figure 8-1 has been modified as per marked up copy provided with comments.

Work Plan

2. All references to proposed single borehole, double-nested, shallow groundwater monitoring wells have been changed to two well clusters. The double-nested wells are defined as two wells installed in a single borehole with each well screened at distinctly different intervals. The two well cluster, on the other hand, is defined as two distinct wells constructed in separate boreholes drilled in close proximity to each other.

Sampling and Analysis Plan

3. The title on the spine of the SAP has been modified as per this comment.

4. See Response Number 2.

5. The procedures for well installation in Section 5 have been revised to reflect the switch from double-nested wells to two-well clusters.

6. Figures 5-1, 2, and 3 have been modified as per this comment to indicate that bollards will be installed outside of the concrete pad into which the protective well casing is set.

Attachment I
USEPA Comments
on the Draft Final RI/FS Work Plan
for Site 35 (Operable Unit 10)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

NOV 03 1993

4WD-FFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Katherine Landman
Department of the Navy - Atlantic Division
Naval Facilities Engineering Command
Code 1823
Norfolk, Virginia 23511-6287

Re: Draft Final Remedial Investigation/Feasibility Study
Work Plan OU10 - Site 35

Dear Ms. Landman:

The Environmental Protection Agency (EPA) has reviewed the above referenced document dated October, 1993. EPA tentatively concurs with the document as submitted with one exception. Comment #12 in the letter dated September 2, 1993 from Gena Townsend to Ms. Linda Berry has not been addressed.

TCE is being used as the indicator compound for soil gas and groundwater sample analysis. This will only identify the area of TCE contamination, although, previous investigations have identified additional contaminants. Once this issue is discussed and rectified EPA will issue final concurrence.

Please call me to discuss the above issue. I can be reached at (404) 347-3016.

Sincerely,

Gena D. Townsend
Senior Project Manager

cc: Mr. Patrick Watters, NCDEHNR
Neal Paul, MCB Camp Lejeune

DAN -
I'D LIKE TO ARRANGE A CONFERENCE CALL TO DISCUSS THIS WITH GENA. HOW DOES TOMORROW A.M. SOUND?
- KATE

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To DAN BONK	From KATE LANDMAN
Co. BAKER	Co. LANTDIV
Dept.	Phone # (804) 322-4818
Fax # (412) 269-2002	Fax # (804) 322-4805

Attachment J
Responses to USEPA Comments on the Draft Final RI/FS Work Plan for Site 35 (Operable Unit 10)

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1510 GILBERT ST
NORFOLK VA 23511-2699

TELEPHONE NO:
(804) 322-4818

IN REPLY REFER TO:
5090
1823:KHL:srw

NOV 15 1993

CERTIFIED MAIL RETURN RECEIPT REQUESTED

United States Environmental Protection Agency, Region IV
Attn: Ms. Gena Townsend
Waste Management Division
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Re: MCB Camp Lejeune
Draft Final RI/FS Project Plans for Operable Unit No. 10
(Site 35)

Dear Ms. Townsend:

This letter summarizes the results of the conference call of November 10, 1993, between EPA Region IV (Ms. Gena Townsend), Atlantic Division, Naval Facilities Engineering Command (Ms. Katherine Landman), and Baker Environmental (Mr. Dan Bonk). Two issues were discussed as follows:

1. Use of TCE as an indicator compound:

A letter dated November 8, 1993 from Ms. Gena Townsend to Katherine Landman indicated EPA's concern over the use of TCE as the only indicator compound for soil gas and groundwater sample analysis. This concern had been addressed earlier in EPA comments on the Draft version of the Project Plans (Specific Comment No. 12 of EPA letter of September 2, 1993).

Result:
Benzene will be used in addition to TCE as an indicator compound for sample analysis. This change will be incorporated in the Final version of the Project Plans.

Use of double-nested wells:

EPA comments on the Draft version of the Project Plans indicated concern over the use of double-nested wells for shallow groundwater monitoring (Specific Comment No. 35 of EPA letter of September 2, 1993). Additional concerns were expressed by Camp Lejeune personnel.

Result:
Well clusters (2 wells, side-by-side) will be used instead of double-nested wells for shallow groundwater monitoring. This change will be incorporated into the Final version of the Project Plans.

Re: MCB Camp Lejeune
Draft Final RI/FS Project Plans for Operable Unit No. 10
(Site 35)

Any questions concerning these issues should be directed to Ms. Katherine Landman at (804) 322-4818.

Sincerely,

GDMcL:th

for L. A. BOUCHER, P.E.
Head
Installation Restoration Section
(South)
Environmental Programs Branch
Environmental Quality Division
By direction of the Commander

Attachment

Copy to:
NC DEHNR (Mr. Patrick Watters)
MCB Camp Lejeune (Mr. Neal Paul)
Baker Environmental, Inc. (Mr. Dan Bonk)
Activity Admin Record File

Attachment K
LANTDIV Comments on the Draft Final RI/FS Work Plan and Sampling and Analysis Plan for Site 35 (Operable Unit 10)

Comments to:
Draft Final Remedial Investigation/Feasibility Study Work Plan for Operable Unit No. 10 (Site 35)
Marine Corps Base, Camp Lejeune North Carolina

For: Katherine Landman
Remedial Project Manager
Atlantic Division, Code 1823

By: William Mullen, P.G.
Technical Remedial Manager
Atlantic Division, Code 1824

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 3

To Dan Bank	From WF Mullen
Co. BAKER ENV.	Co. LANTDIV
Dept.	Phone # 1-804-322-4588
Fax # 1-412-269-2002	Fax #

1) Page 2-11, Section 2.2.1. How are the UST's supplied by the AST's? Is there pipelines, or by trucks?

2) Page 2-13, Section 2.2.2. When were the trenches dug and the fuel ignited? Immediately after the spill or several years later?

3) Page 2-18, Section 2.2.4. Third Paragraph, correct spelling.

4) Page 2-18 and 2-19, Section 2.2.4. Why only discuss findings for contamination in the shallow watertable aquifer? References to higher concentrations of the contaminants in the deep zone need to be clarified.

5) Page 2-19, Section 2.2.4. What does MTBE look like? Please correct wording to reflect that concentrations of MTBE were detected in samples collected from the wells.

6) Page 2-19, Section 2.2.4. Last sentence. Which "this" is refered to in the sentence? Is it the "this RI/FS" or the "Interim RI/FS, focused on fuel and oil impacted soil" that were both referenced in the preceeding sentence? Please clarify wording.

7) Page 3-1, Section 3.1. Why is additional investigation needed to define the halogenated organic contmanintation in shallow groundwater? TCE is a dense solvent, and if present in the shallow zone should be assumed to be deeper unless sampling has shown that it is not present. Please revise section.

8) Page 3-2, Section 3.2, Exposure Pathways. Potential migration of contamination into deeper drinking water aquifer and use of that zone.

9) Page 3-3, Section 3.4.1. NCWQS will drive since they are generally stricter than Federal MCL's. State has final say on cleanup levels required.

10) Page 5-2, Section 5.3.2. What depth will the soil gas samples be collected?

11) Page 5-4, Section 5.3.2. 2nd Paragraph. Poor wording, sampling grid will not screen soil and groundwater. The analytical results from samples collected at the site corresponding to the grid points on the map can be used to identify the presence and concentration, if any, of contaminants of concern.

12) Page 5-11, Section 5.3.4.2, Please define well drilling methods and planned sampling intervals. What samples will be done sent for laboratory analysis, if any? How well well screens be set?

13) Page 5-13, Section 5.3.4.3, 2nd paragraph. Please explain the benefit of collecting samples for analysis using non-TCL VOAs methods.

Comments to:
Draft Final Remedial Investigation/Feasibility Study Sampling and analysis plan for Operable Unit No. 10 (Site 35)

14) Page 2-2, Table 2-1. 1st bullet, Site specific RI/FS Objectives for Groundwater at Camp Geiger Fuel Farm. Unclear, please reword.

✓ 15) Page 2-2, Table 2-1. Why is there no investigation of the confining unit? This is a significant unit with respect to limiting vertical migration and therefore exposure pathways.

16) Page 2-3, Section 2.2, Groundwater. What flexibility is there to identify the extent of groundwater contamination within the deeper aquifer?

17) Page 2-4, Section 2.2, Chemical properties identified at the site should be evaluated for compliance with ***both*** State and Federal Drinking Water Standards. However, compliance will be required to be to the standards that are most protective of human and environmental health.

18) Page 3-8, Section 3.2.3. Collection of samples for grain size analysis to determine estimated hydraulic conductivity for the "confining zone" may not be accurate enough for design criteria. Modification of the sampling program to allow collection of undisturbed sample(s) from the "confining zone" would *yield actual hydraulic conductivities for this zone. In addition, grain size analysis can be conducted on that sample after the constant head permeability testing so that a direct comparison can be made between hydraulic conductivities and grain size analysis can be made. Then, grain size analysis of samples collected elsewhere at the site can be directly related to hydraulic conductivity.* Please provide an estimate of costs to collect undisturbed samples and analyzing the samples for both constant head permeability and grain size.

19) Page 3-9, Section 3.3.1. Please define water table elevation fluctuations from previously recorded waterlevels at the site or camp-wide. 15 feet of screen implies a significant variation in elevation. Does each shallow well need 15 foot screen lengths?

20) Page 3-10, Section 3.3.2. What is the advantage to keeping similar well screen lengths for the deeper part of the shallow aquifer? If constructed as designed, will there be any zones that are not monitored within the shallow aquifer? How will these unsampled zones, if they occur, be accounted for in any remedial design?

21) Page 3-10, Section 3.3.2. Reference to an "assumed confining layer". Please explain how field work will confirm presence of confining layer prior to setting well immediately below it?

22) Page 3-10, Section 3.3.2. What is the estimated thickness of the confining unit underlying the site? Does this unit change thickness across the site? How will a thicker than expected affect well installation and field time?

23) Page 3-11, Section 3.3.3. Will analysis using EPA method 601/02 be adequate for remedial design requirements?

Attachment L
Responses to LANTDIV Comments on the Draft Final RI/FS Work Plan and Sampling and Analysis Plan for Site 35 (Operable Unit 10)

**Responses to Comments from LANTDIV (W. Mullen)
for the Draft Final RI/FS Work Plan and Sampling and Analysis Plan
Operable Unit No. 10 (Site 35),
MCB Camp Lejeune, North Carolina**

Comments Letter Dated December 12, 1993

RESPONSES TO COMMENTS

Work Plan

1. Product is dispensed from the ASTs via trucks and underground piping.

2. No information is available regarding the locations of interceptor trenches that were excavated to facilitate the collection and combustion of migrating MOGAS. The information presented in this section represents the extent of what is available.

3. The misspelling has been corrected.

4. Section 2.2.4 has been modified to provide more specific data regarding detected contamination in the deeper groundwater zone.

5. Phrases such as "seen" and "identified" regarding MTBE have been changed to "detected".

6. The reference to "this RI/FS" has been changed to "the full RI/FS".

7. The additional investigation of the shallow aquifer is intended to define the limits of previously detected halogenated organic compounds which, based on available data, is not limited to TCE.

8. The last bullet under Exposure Pathways in Section 3.2 has been modified to include the future potential use of shallow and deep groundwater.

9. Baker concurs with this comment, but, has made no modification to Section 3.4.1. Determining which ARARs are most significant will be performed under the RI/FS.

10. The text has been modified to indicate that soil gas samples will be obtained from the unsaturated interval located just above the shallow groundwater surface.

11. The text has been modified as per the comment.

12. Specific information regarding well drilling methods is presented in Section 5.2 of the SAP. A sentence has been added to the text of the Work Plan (Section 5.3.4.2, 1st paragraph) that indicates the deep well screens will be set immediately below the clay layer. Groundwater samples obtained from these intervals are intended to provide data regarding the effectiveness of the clay as an aquitard. Four of the five proposed deep monitoring wells, including GWD-2

through GWD-5, are to be installed in areas where contamination was previously detected in the shallow groundwater zone above the clay layer (Note: The deep groundwater monitoring well, GWD-1, is located in the northwest corner of the site so as to provide background data).

One subsurface soil sample will be obtained from each of the five deep monitoring wells from the interval located immediately above the static groundwater surface. The rationale for this sample is provided in Section 5.3.3.2.

13. Two sentences have been added to the second paragraph of Section 5.3.4.3 to provide rationale for using non-TCL VOAs methods. The analysis of VOAs via EPA Method 601/602 is preferred because the method detection limits are lower than those provided under TCL Organics methodology. The results at the lower detection limits are needed for comparison to groundwater MCLs (Maximum Contaminant Limits).

Sampling and Analysis Plan

14. The text has been modified as per this comment.

15. The investigation of groundwater quality in the zone below the deep aquifer is, essentially, an investigation of the confining unit. Four of the five deep well borings (GWD-2 through GWD-5) will be drilled and sampled for the purpose of identifying and penetrating the confining layer in areas where contamination in shallow groundwater above the confining layer was previously detected. Well GWD-1 is intended to serve as a background location. Whether or not contamination is detected in wells GWD-2 through GWD-5 should be indicative of the confining characteristics of this unit.

16. See response to Comment 15.

17. The text has been modified as per this comment.

18. The collection of a single sample for analysis of particle size distribution and Atterberg Limits from the confining layer interval intercepted during drilling at GWD-1 is intended to provide additional information to aid in the precise physical classification of this unit. Additionally, classification data can be used to afford an empirical-based estimate of hydraulic conductivity. This data will be sufficient in that its intended use is to support the contention that the unit is indeed a confining layer, if the results of the analysis of groundwater samples obtained from GWD-2 through GWD-5 indicated the presence of no detectable organic contamination. If the results indicate the presence of organic contaminants, then the unit clearly can not be classified as a confining layer.

    Undisturbed samples cost roughly $50 per sampleto obtain. Constant head permeability tests cost approximately $375 per test to run. Particle size distribution and Atterberg Limits cost approximately $275 combined. Thus, the combined cost of obtaining undisturbed samples and performing the above tests is roughly $700 per event (excluding shipping, handling, sample tracking, data evaluation, and data tabulation).

    Based on conversations with W. Mullen of LANTDIV, the text has been modified to facilitate the recovery of a single undisturbed soil sample from the underlying clay layer encountered in GWD-1. Constant head permeability will be performed as an additional test.

19. Insufficient water level elevation data is available to afford an evaluation of water table fluctuations. Baker has modified the Work Plan and SAP to specify 10-foot long screen lengths for the shallow wells set to monitor the groundwater surface.

20. The deeper shallow monitoring wells are specified with 5-foot long screens to be consistent with existing wells at the site. Assuming the groundwater surface will be encountered at 10 feet bgs, the base of the screen of the groundwater surface monitoring well will be set at 18 feet bgs. It is likely that 10 to 15 feet will be between the base of the groundwater surface well screen and the top of the deeper well screen set atop the clay layer. The unsampled zones will be readily accounted for in any future design by extrapolation of the results from the upper and lower shallow groundwater monitoring wells.

21. Presently, it is not known whether or not the underlying clay layer is a confining layer. The confirmation of this assumption is one of the objectives of this study. It is to be accomplished by the installation of these five deep wells, four of which are to be installed in areas where organic contamination was previously detected above the clay layer. Analysis of groundwater samples obtained from below the clay should provide sufficient data for evaluation of this unit as an aquitard.

22. The thickness of this unit at this site is not known because no borings drilled to date have penetrated it. Based on available reference material and Baker's experience at other areas at Camp Lejeune , the clay layer thickness can vary from two to ten feet.

23. Relative to the analysis of VOAs, EPA Method 601/602 will provide data useful in a remedial design. Additional design data may be required which could be obtained via an appropriate treatability study.